Remarks

In view of the above amendments and the following remarks, favorable reconsideration of the outstanding office action is respectfully requested. Claims 1 – 27 remain in this application. Claims 1 and claim 10 has been amended.

1. § 112 Rejections

The Examiner has rejected claims 1 – 9 and 24 under 35 U.S.C. § 112, first paragraph, for lack of enablement. In particular, the Examiner asserts that the claims contain subject matter which was not described in the specification in such a way as to enable one of ordinary skill in the art to make or use the invention.

In particular, the Examiner asserts that "the specification discloses filling the green body or container or capsule with glass particles and then conducting a hot isostatic process. It is unclear how the instant process could be conducted without the glass particle filling step. Without the filling step, the hollow slip cast green body, container or capsule would be crushed from the pressure."

The Examiner states the legal standard correctly, but fails to apply the standard correctly. As noted above, the enablement standard requires that the claimed subject matter be described in the specification in such a way as to enable one of ordinary skill in the art to make or use the invention. The Examiner's rejection does not apply the test to the claimed subject matter, he applies it to the specification.

The Examiner begins his statement of rejection by saying "*the specification discloses filling the green body…*" Both independent claim 1 and independent claim 24 merely recite the step of "providing a green body" that includes a non-porous exterior portion and a porous interior portion. The claims depending from claim 1 also say nothing about "filling the green body or container or capsule with glass particles." Thus, the Examiner reverses the test for enablement. Instead of determining if the claims are enabled by the specification, the Examiner is trying to determine if the specification is enabled by the claims. This is an improper application of the enablement test.

Accordingly, the Examiner's rejection of claims 1 – 9 and 24 under 35 U.S.C. § 112, first paragraph is improper. The Applicants respectfully request that the rejection be withdrawn.

2. § 103 Rejections

A. The Examiner has rejected claims 1, 5 – 7, and 23 - 27 under 35 U.S.C. § 103 as being unpatentable for obviousness over U.S. Patent No. 4,938,788 to Segawa et al. [hereinafter Segawa] 5,244,585 in view of U.S. Patent No. 5,244,485 to Hihara et al. [hereinafter Hihara]. The Applicants respectfully traverse the rejection.

Currently amended claim 1 is directed to a method for forming an optical blank. The method including the step of providing a solid porous green body. The green body includes a porous exterior portion and a porous interior portion. The exterior portion is glazed to thereby form a non-porous exterior portion of the green body. The porous interior portion is evacuated to thereby create a vacuum in the porous interior portion. The green body is pressed using a hot isostatic pressing technique, whereby the green body is densified into a solid glass optical blank.

Original claim 23 is directed to a method for forming an optical blank. The method includes the step of providing a green body that has a non-porous exterior portion. The green body is a vitreous container having a hollow interior enclosed by a porous interior wall. The hollow interior is characterized by a volume capacity. The vitreous container is filled with a glass powder. A volume of the glass powder that fills the vitreous container is substantially equal to the volume capacity of the vitreous container. The interior portion is evacuated to thereby create a vacuum in the hollow interior. The vitreous container is heated to render the vitreous container plastic, the temperature of the glass powder being raised to an appropriate compacting temperature. An external pressure is applied to the vitreous container, the external pressure collapses the vitreous container about the glass powder disposed within the vitreous container, to fully densify the glass powder and form a solid glass optical blank. The densified solid glass optical blank is then cooled.

Original claim 24 is directed to a method for forming an optical blank. The method includes the step of providing a green body. The green body includes a non-porous exterior portion and a porous interior portion, the interior portion being a porous solid. The interior portion is evacuated to thereby create a vacuum in the interior portion. The green body is heated to render the green body container plastic. The temperature of the porous interior portion being raised to an appropriate compacting temperature. An external pressure is applied to the green body. The external pressure collapses the green body until the interior

portion is fully densified, forming a solid glass optical blank. The densified solid glass optical blank is then cooled.

Original claim 25 is directed to a method for forming an optical blank. The method includes the step of providing a fused silica tube having an interior portion. The fused silica tube is filled with glass particles. The interior portion is evacuated to thereby create a vacuum in the interior portion. The fused silica tube is heated to thereby densify the fused silica tube into a solid glass body.

Segawa is directed to a method for producing a uniform silica glass block. A capsule of silica glass is filled with a silica powder. The capsule and powder are treated at high temperature and pressure by a hot press and/or a hot isostatic press in a vacuum or in an inert gas atmosphere. By conducting calcination in fluorine, chlorine or their compound gas and then in oxygen, the OH group content of the silica glass is reduced dramatically.

Hihara is directed to a method of manufacturing a silica glass preform for an optical fiber. The method includes the steps of inserting a rod-like member, mainly containing a ductile material, into a forming space of a mold. The remaining space of the forming space is charged with a forming material containing silica glass powder or doped silica glass powder. The mold charged with the forming material is compressed from outside such as to form a porous glass body of the forming material around the rod-like member. The rod-like member is removed from the porous glass body. A glass rod is inserted into the hole formed after removal of the rod-like member. The porous glass body in which the glass rod is inserted is purified. Finally, the purified porous glass body is consolidated.

According to the **MPEP 2143**, three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

1. The prior art references do not teach or suggest all the claim limitations:

Regarding newly amended independent claim 1, the claimed method includes the step of glazing an exterior portion of a solid porous green body to thereby form a non-porous

exterior portion of the green body having a porous interior portion. The Examiner agrees that Segawa does not teach this feature because he points out that Segawa fills a glass capsule with glass particles. Further, the Examiner has not provided any evidence to suggest that Hihara teaches this feature either. Thus, the Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the steps of providing a solid porous green body, or the step of glazing an exterior portion of a solid porous green body to thereby form a non-porous exterior portion of the green body having a porous interior portion, as recited in claim 1.

While Segawa teaches the step of applying a vacuum to a hollow glass capsule that is filled with glass particles, the Examiner has not pointed out where Segawa teaches or suggests evacuating a porous interior portion of a green body to create a vacuum in the porous interior portion. The Examiner has not provided any evidence to suggest that Hihara teaches this feature either. As such, the Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the step of evacuating a porous interior portion of a green body to create a vacuum in the porous interior portion of a green body, as recited in claim 1.

While Segawa teaches the step of applying a vacuum to a hollow glass capsule that is filled with glass particles, the Examiner has not pointed out where Segawa teaches or suggests pressing a solid green body, having a non-porous exterior and a porous solid interior, to densify the green body into a solid glass optical blank. The Examiner has not provided any evidence to suggest that Hihara teaches this feature either. The Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the step of pressing the green body using a hot isostatic pressing technique, whereby the green body is densified into a solid glass optical blank, as recited in claim 1.

Accordingly, the Examiner has not shown where Segawa alone, or the combination of Segawa and Hihara, teach or suggest all of the claim elements recited in independent claim 1. While claims 2 – 9 are patentable in their own right, these claims are also allowable by virtue of depending from claim 1.

Regarding original claim 23, the Examiner provides no independent examination of this claim, but merely asserts that the claim is obvious over Segawa, or Segawa in view of Hihara. The claimed method includes the step of providing a green body that has a non-porous exterior portion. Further, claim 23 recites that the green body is a vitreous container having a hollow interior enclosed by a porous interior wall.

The Examiner states that Segawa employs a glass capsule. On page 2 of his Office Action, the Examiner also explains that the glass container discloses by Segawa is "inherently non-porous." Thus, the Examiner provides no evidence suggesting that Segawa teaches a green body that is a vitreous container having a hollow interior enclosed by a porous interior wall. Further, the Examiner has not provided any evidence to suggest that Hihara teaches a green body that is a vitreous container having a hollow interior enclosed by a porous interior wall. Therefore, the Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the step of providing a green body that is a vitreous container having a non-porous exterior portion and a hollow interior enclosed by a porous interior wall.

Accordingly, the Examiner has not shown where the combined references teach or suggest all of the claim elements recited in independent claim 23.

The Examiner provides no independent analysis of claim 24. The Examiner asserts that Segawa teaches a glass capsule that is filled with glass particles. However, as noted above, the Examiner failed to point out where Segawa teaches the step of providing a green body that includes a non-porous exterior portion and a porous interior portion, the interior portion <u>being a porous solid</u>, as recited in claim 24. The Examiner has not provided any evidence to suggest that Hihara teaches a green body that includes a non-porous exterior portion and a porous interior portion, the interior portion being a porous solid. As such, the Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the step of providing, as recited in claim 24.

The Examiner asserts that Segawa teaches that a vacuum may be applied to a glass capsule filled with glass particles. However, the Examiner failed to point out where Segawa teaches the step of evacuating a solid interior portion of a green body to create a vacuum in solid porous interior portion of the green body, as recited in claim 24. The Examiner has not provided any evidence to suggest that Hihara teaches the step of evacuating a solid porous interior portion of a green body either. Thus, the Examiner has not pointed out where Segawa or Hihara, whether taken alone or in combination, teach or suggest the step of evacuating, as recited in claim 24.

Accordingly, the Examiner has not shown where the combined references teach or suggest all of the claim elements recited in independent claim 24.

The Examiner provides no independent analysis of claim 25. The Examiner failed to point out where Segawa teaches the step of providing a fused silica tube having an interior portion filled with glass particles, as recited in claim 25. The Examiner has not provided any evidence to suggest that Hihara teaches this step either.

Accordingly, the Examiner has not shown where the combined references teach or suggest all of the claim elements recited in independent claim 25. While claims 26 – 27 are patentable in their own right, these claims are also allowable by virtue of depending from claim 25.

> 2. There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings:

As noted above, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference, or combine reference teachings. The Examiner does not provide any rationale as to why one of ordinary skill in the art would be motivated to modify Segawa to obtain the claimed invention.

The Examiner asserts that direct one of ordinary skill in the art would be motivated to combine Segawa with Hihara because it would be obvious to use glass particles prepared by flame hydrolysis (Hihara) with the method of Segawa. The Applicants note that none of the rejected claims recite using glass particles formed by flame hydrolysis.

However, one of ordinary skill in the art would not be motivated to combine Segawa and Hihara because it would change the principle of operation of the prior art being modified, i.e., Segawa. See **MPEP 2143.01**. Segawa is directed to a process for producing *a uniform silica glass block.* Hihara is directed to a method for producing an optical fiber preform. Because Hihara teaches the step of introducing a ductile rod into the agglomerate, and thereby introducing impurities into the agglomerate used in making the preform, one of ordinary skill in the art would not be motivated to combine Hihara with Segawa. The introduction of impurities into the agglomerate would result in a non-uniform glass block. Further, Hihara teaches the step of inserting a glass rod of a different refractive index into the space vacated by the ductile rod member. This step also results in a non-uniform glass object being produced.

In light of the above analysis, claims 1, 5 – 7, and 23 - 27 are patentable under 35 U.S.C. § 103 because the Examiner did not provide a prima facie case of obviousness. In particular, the Examiner did not point out where all the claim limitations may be found in the cited references. Further, there is no motivation to modify Segawa, or in the alternative, combine Segawa with Hihara. Accordingly, the Applicants respectfully request that the rejection under 35 U.S.C. § 103 be withdrawn.

B. The Examiner has rejected claims 2 – 4, 8, and 10 - 22 under 35 U.S.C. § 103 as being unpatentable for obviousness over Segawa taken alone or with Hihara as applied to claims 1, 5 – 7, and 23 – 27 above, and further in view of U.S. Patent No. 5,866,062 to Moritz et al. [hereinafter Moritz] or U.S. Patent No. 5,736,206 to Englisch et al. [hereinafter Englisch] and/or U.S. Patent No. 3,301,635 to Bergna et al. [hereinafter Bergna].

Currently amended claim 10 is directed to a method for forming an optical blank. The method includes the step of providing glass particles, the glass particles being a mixture of glass soot and ground glass cullet. The glass particles are mixed with water to form an aqueous suspension. The aqueous suspension is poured in a mold, and the suspension is allowed to cast in the mold for a predetermined time, to thereby form a green body wall. The remaining aqueous suspension is removed from the mold, such that the interior portion is hollow. The green body is dried to form a vitreous container having a porous interior glass wall, the vitreous container having a volume capacity. The vitreous container is filled with a glass powder having substantially the same material composition as the glass particles. A volume of the glass powder filling the vitreous container is substantially equal to the volume capacity of the vitreous container. The exterior portion is glazed or flame polished to thereby form a non-porous exterior portion of the green body. The porous interior portion is evacuated to thereby create a vacuum in the porous interior portion. The green body is pressed using a hot isostatic pressing technique, whereby the green body is densified into a solid glass optical blank.

Both Segawa and Hihara were discussed above.

Moritz discloses shaped bodies that have a wall thickness in the range from 1 to 100 mm owing to their flexural strength, heat resistance and their high chemical purity, they are particularly suitable as support facility or as substrate for high-purity bodies such as, for example, silicon wafers which are subjected to high-temperature treatment at up to 1300.degree. C. The shaped bodies of the invention are also very suitable as components in or

for reactors of very high-purity quartz glass in which semi-finished silicon parts for semiconductor components are treated. They can also be made in the form of hollow bodies, preferably in the form of a flange or crucible, with the crucibles being able to be used, for example, for calcining inorganic substances such as phosphors, or as fusion crucibles, for example for gold. The shaped bodies are non-porous, typically having a maximum pore dimension of less than 20μm.

Englisch discloses a molded body can be designed as a hollow component, where at least parts of its exterior and/or interior surface form the transparent surface region. Hollow components of this type can be, for example, a pipe. The density of the opaque, porous base material and the density of the base material made transparent by the heat treatment do not differ essentially from each other. Because of the low percentage of pores per unit volume in the base material, the base material which has been transformed into transparent material also fails to show any significant amount of shrinkage.

Bergna discloses a process for making amorphous silica bodies by compacting aggregates of amorphous silica. The aggregates have a particle size in the range between 0.1 to 50 microns.

1. The prior art references do not teach or suggest all the claim limitations:

Claim 10 is currently amended to put the claim in independent form. The Examiner asserts that the "claims recite details regarding the production of the green body or glass capsule by casting or glass blowing." The examiner submits that glass forming techniques for the production of hollow articles by casting..."are well known and obvious to those skilled in the art." However, the Examiner's rejection does not address the individual elements of every claim.

In particular, the examiner does not point out where Segawa, Hihara, Moritz, Englisch, or Bergna, whether taken alone or in combination, teach or suggest the step of providing glass particles, the glass particles being a mixture of glass soot and ground glass cullet, as recited in claim 10.

The examiner does not point out where Segawa, Hihara, Moritz, Englisch, or Bergna, whether taken alone or in combination, teach or suggest the steps of mixing the mixture of glass soot and ground glass cullet, to form an aqueous suspension, pouring the aqueous suspension in a mold, and casting the aqueous suspension to thereby form a vitreous container having a porous interior glass wall. As noted above, the glass capsule disclosed by Segawa

does not have a porous interior wall. Further, as noted above, both Moritz and Englisch disclose glass objects that have low porosity.

The examiner also does not point out where Segawa, Hihara, Moritz, Englisch, or Bergna, whether taken alone or in combination, teach or suggest the step of "filling the vitreous container with a glass powder having substantially the same material composition as the glass particles," as recited in claim 10. As noted above, glass powder having the same material composition as the glass particles, would include glass soot and ground glass cullet.

The examiner does not point out where Segawa, Hihara, Moritz, Englisch, or Bergna, whether taken alone or in combination, teach or suggest the step of "glazing or flame polishing the exterior portion to thereby form a non-porous exterior portion of the green body, i.e., the vitreous container, as recited in claim 10.

Accordingly, claim 10 is patentable under 35 U.S.C. § 103. Claims 11 – 19 are patentable in their own right, and are also patentable by virtue of their dependency from claim 10.

As noted above, claim 1 is patentable over Segawa, or Segawa in combination with Hihara. The Examiner does not assert that Moritz, Englisch, or Bergna remedy the deficiencies of Segawa, or Segawa in combination with Hihara. Thus, claims 2 – 4, 8, and 10 – 22 are allowable by virtue of their dependency from claim 1.

2. There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings:

In Section 2A above, the Applicants pointed out that those of ordinary skill in the art would not be motivated to combine Segawa and Hihara because it would change the principle of operation of the prior art being modified, i.e., Segawa. The rationale presented above applies here as well.

In light of the above analysis, claims 2 – 4, 8, and 10 – 22 are patentable under 35 U.S.C. § 103 because the Examiner did not make a prima facie case of obviousness. In particular, the Examiner does not point out where all the claim limitations may be found in the cited references. Further, there is no motivation to modify Segawa, or in the alternative, combine Segawa with Hihara, or Segawa with Hihara, Moritz, Englisch, and Bergna. Accordingly, the Applicants respectfully request that the rejection under 35 U.S.C. § 103 be withdrawn.

3. Conclusion

Based upon the amendments, remarks, and papers of record, Applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests reconsideration of the pending claims 1 – 27 and a prompt Notice of Allowance thereon.

Applicant believes that a one-month extension of time is necessary to make this Response timely. Should Applicant be in error, Applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Response timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 50-0289.

Please direct any questions or comments to Daniel P. Malley at (607) 256-7307.

Respectfully submitted,

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